VERTICAL HORIZON
VH-8G
GIGABIT ETHERNET SWITCH

USER GUIDE

ENTERASYS NETWORKS™

9033639

Only qualified personnel should perform installation procedures.

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Order Number: 9033639 November 2000

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The VH-8G 8-port switch uses Class 1 Laser transceivers. Read the following safety information before installing or operating these modules.

Class 1 laser transceivers use an optical feedback loop to maintain Class 1 operation limits. This control loop eliminates the need for maintenance checks or adjustments. The output is factory set, and does not allow any user adjustment. Class 1 Laser transceivers comply with the following safety standards:

- 21 CFR 1040.10 and 1040.11 U.S. Department of Health and Human Services (FDA).
- IEC Publication 825 (International Electrotechnical Commission).
- CENELEC EN 60825 (European Committee for Electrotechnical Standardization).
- When operating within their performance limitations, laser transceiver output meets the Class 1 accessible emission limit of all three standards. Class 1 levels of laser radiation are not considered hazardous.

SAFETY INFORMATION
CLASS 1 LASER TRANSCEIVERS
LASER RADIATION AND CONNECTORS

When the connector is in place, all laser radiation remains within the fiber. The maximum amount of radiant power exiting the fiber (under normal conditions) is -12.6 dBm or 55 x 10^{-6} watts.

Removing the optical connector from the transceiver allows laser radiation to emit directly from the optical port. The maximum radiance from the optical port (under worst case conditions) is 0.8 W cm^{-2} or 8 x 10^{3} W m^{2} sr^{-1}.

Do not use optical instruments to view the laser output. The use of optical instruments to view laser output increases eye hazard. When viewing the output optical port, power must be removed from the switch.

WARNING: FIBER OPTIC PORT SAFETY

When using a fiber optic port, never look at the transmit laser while it is powered on. Also, never look directly at the fiber TX port and fiber cable ends when they are powered on.

AVERTISSMENT: PORTS POUR FIBRES OPTIQUES - SÉCURITÉ SUR LE PLAN OPTIQUE

Ne regardez jamais le laser tant qu'il est sous tension. Ne regardez jamais directement le port TX (Transmission) à fibres optiques et les embouts de câbles à fibres optiques tant qu'ils sont sous tension.

WARNHINWEIS: FASEROPTIKANSCHLÜSSE - OPTISCHE SICHERHEIT

Niemals ein Übertragungslaser betrachten, während dieses eingeschaltet ist. Niemals direkt auf den Faser-TX-Anschluß und auf die Faserkabelenden schauen, während diese eingeschaltet sind.

SAFETY INFORMATION
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1. Bitte lesen Sie diese Hinweise sorgfältig durch.
2. Heben Sie diese Anleitung für den späteren Gebrauch auf.
3. Vor jedem Reinigen ist das Gerät vom Stromnetz zu trennen. Verwenden Sie keine Flüssigoder Aerosolreiniger. Am besten eignet sich ein angefeuchtetes Tuch zur Reinigung.
4. Die Netzanschlu ßsteckdose soll nahe dem Gerät angebracht und leicht zugänglich sein.
5. Das Gerät ist vor Feuchtigkeit zu schützen.
6. Bei der Aufstellung des Gerätes ist auf sicheren Stand zu achten. Ein Kippen oder Fallen könnte Beschädigungen hervorrufen.
7. Die Belüftungsöffnungen dienen der Luftzirkulation, die das Gerät vor Überhitzung schützt. Sorgen Sie dafür, daß diese Öffnungen nicht abgedeckt werden.
8. Beachten Sie beim Anschluß an das Stromnetz die Anschlußwerte.
9. Verlegen Sie die Netzanschlußleitung so, daß niemand darüber fallen kann. Es sollte auch nichts auf der Leitung abgestellt werden.
10. Alle Hinweise und Warnungen, die sich am Gerät befinden, sind zu beachten.
11. Wird das Gerät über einen längeren Zeitraum nicht benutzt, sollten Sie es vom Stromnetz trennen. Somit wird im Falle einer Überspannung eine Beschädigung vermieden.
12. Durch die Lüftungsöffnungen dürfen niemals Gegenstände oder Flüssigkeiten in das Gerät gelangen. Dies könnte einen Brand bzw. elektrischen Schlag auslösen.
13. Öffnen sie niemals das Gerät. Das Gerät darf aus Gründen der elektrischen Sicherheit nur von authorisiertem Servicepersonal geöffnet werden.
14. Wenn folgende Situationen auftreten ist das Gerät vom Stromnetz zu trennen und von einer qualifizierten Servicestelle zu überprüfen:
    a. Netzkabel oder Netzstecker sind beschädigt.
    b. Flüssigkeit ist in das Gerät eingedrungen.
    c. Das Gerät war Feuchtigkeit ausgesetzt.
    d. Wenn das Gerät nicht der Bedienungsanleitung entsprechend funktioniert oder Sie mit Hilfe dieser Anleitung keine Verbesserung erzielen.
    e. Das Gerät ist gefallen und/oder das Gehäuse ist beschädigt.
    f. Wenn das Gerät deutliche Anzeichen eines Defektes aufweist.
15. Zum Netzanschluß dieses Gerätes ist eine geprüfte Leitung zu verwenden. Für einen Nennstrom bis 6A und einem Gerätegewicht größer 3kg ist eine Leitung nicht leichter als H05VV-F, 3G, 0.75mm^2 einzusetzen.

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Manufacturer's Address:	**35 Industrial Way** **PO Box 5005** **Rochester, NH 03867**
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Equipment Type/Environment:	**Networking Equipment, for use in a Commercial or Light Industrial Environment.**

We the undersigned, hereby declare, under our sole responsibility, that the equipment packaged with this notice conforms to the above directives.

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Title	Title
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PREFACE

Purpose

This guide provides information about the features and applications of the Enterasys Networks Vertical Horizon VH-8G switch system.

Audience

This guide is intended for Ethernet Local Area Network (LAN) administrators and Management Information Systems (MIS) personnel with the following background:

- Working knowledge of Ethernet LANs
- Familiarity with Transmission Control Protocol/Internet Protocol (TCP/IP) and Simple Network Management Protocol (SNMP)

Conventions

This section describes the conventions used in this guide.

Message Formats

Two types of messages, identified by icons, appear in the text:

A note informs you of special circumstances.

A caution indicates the possibility of equipment damage.

Keyboard Entries

This guide uses the following conventions for keyboard entries:

- When you read “enter,” type the text and press the [Enter] key.
- Example: Enter the Gateway IP address and press the [Enter] key.
- When you read “select,” highlight the menu item and press the [Enter] key.

Other Conventions

This guide uses the following typographical conventions:

- Initial Caps — Menu titles and console menu selections.
- [Enter] — Used to designate the Enter or Return key.
- courier font — Screen messages and user prompts.
- Selection — Describes a user-configurable user interface item.
- Field — Describes a read-only information item.

Organization

Chapter 1. Product Overview: Describes the features of the switch, front and rear panel components and application examples.

Chapter 2. Installation: Describes the content of your switch shipment, lists site requirements, and provides mounting instructions. Instructions for making connections and powering up the switch are provided as well.

Appendix A. Technical Specifications: Provides a list of standards compliance and certifications as well as physical and operational specifications.

Appendix B. Flow Control: Describes how the flow control features are used to provide a mechanism for protecting the switch from overload conditions and to keep additional traffic off the network.

Appendix C. Acronyms and Abbreviations: Provides definitions for a list of common acronyms and abbreviations used within the installation guide and the networking industry.

1. PRODUCT OVERVIEW

This chapter provides the following information:

- Product Description
- Features
- Front and Rear Panel Component Descriptions
- Feature Summaries
- Application Example

Description

This installation guide describes Enterasys' VH-8G Gigabit Ethernet switch. This switch provides 8 1000Base-SX ports and includes an SNMP-based management agent with support for both in-band and out-of-band access for managing the switch.

The switch employs a high-speed switching fabric. This design allows for simultaneous transport of multiple packets at low latency on all ports. It also uses store-and-forward switching to ensure maximum data integrity. In this mode, the entire packet must be received into a port buffer and checked for validity before being forwarded. This prevents errors from being propagated throughout the network. This switch also features full-duplex capability on all ports, which effectively doubles the bandwidth of each connection.

The RMON/SNMP/Web management agent provides a broad range of management options. It includes a standards-compliant Simple Network Management Protocol (SNMP) agent. The SNMP agent allows network management station applications to collect and present status and performance information about the switch, as well as providing the ability to configure and control functions in the switch. The SNMP agent also supports Remote Monitoring (RMON) for Statistics, History, Alarm and Event groups (Groups 1-3, 9).

Network management can be performed in-band using TCP/IP or Telnet connection to the serial console port on the switch's rear panel. The switch also includes a built-in Web agent that provides management access via common http browsers such as Netscape Navigator and Microsoft's Internet Explorer. In addition, the console port allows out-of-band management using a PC or terminal.

This switch also provides support for a Redundant Power Unit to ensure continuous operation in the event of a power failure.

The VH-8G switch is desktop or rack-mountable. LEDs on the front panel provide information about the operating status of the switch. The rear panel contains the power connector, redundant power connector, and the serial console port. The side panel includes two fans that maintain ventilation and cooling for internal switch components.

Features

- Ports:
  - 8 1000Base-SX ports using SC multimode fiber optic connectors
  - 1 redundant power unit socket
- Switch Architecture:
  - Auto-negotiation of half/full-duplex operation on all ports
  - IEEE 802.3x flow control auto-negotiation on all ports
  - 1 MB packet buffering per port
  - Store-and-forward switching
  - 12K address forwarding table
  - Forwarding: 1,488,000 packets-per-second (64 byte packets) @1000 Mbps
  - Filtering: 1,488,000 packets-per-second (64 byte packets) @1000 Mbps
- Network Management:
  - SNMP compliant agent: MIB II (RFC 1213); Bridge MIB (RFC 1493); Ethernet-like MIB (RFC1643); RMON - Statistics, History, Alarm and Event groups (RFC 1757); private MIB extensions
  - Access via in-band, Internet browser, or Telnet
  - Console port (RS-232, male DB-9 connector, null modem) supports access via direct connection
  - BootP for IP address configuration
- Reliability:
  - Redundant power supply support
- Software:
  - Extensive diagnostics for product testing and troubleshooting
  - Firmware upgrades using the console port or in-band with TFTP
- LED Indicators:
  - System: Power
  - 1000Base-SX ports: link/disable, activity

Front Panel

Figure 1-1 shows the front panel of the Enterasys VH-8G. Table 1-1 defines the VH-8G front panel components.

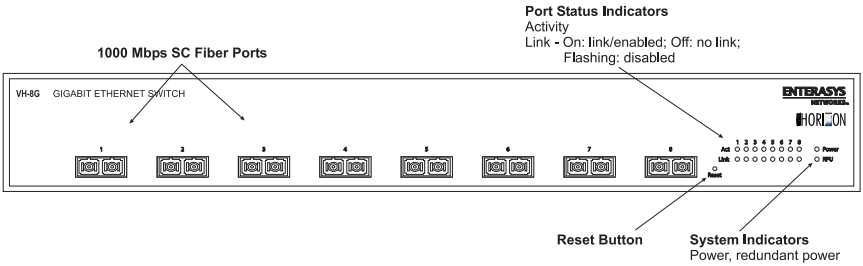

Figure 1-1. VH-8G Front Panel

Table 1-1. Front Panel Components

Name	Function
Power LED	Lights steady green to indicate power is supplied to the switch. Lights steady amber to indicate that the switch's power-on self-test (POST) is running. Off indicates no power is supplied to the switch.
RPU LED	Lights steady to indicate that a redundant power unit is attached and is in backup or active mode.
Link LEDs	Lights steady green to indicate a 1000 Mbps link, off indicates no link; and flashing indicates that the port has been manually disabled.
Activity LEDs	Flashing green indicates activity on the port segment.
Reset Button	Causes the unit to perform a hardware reset, similar to removing and reconnecting the power.
1000Base-SX SC ports	Fiber ports using SC port connectors.

Rear Panel

Figure 1-3 shows the VH-8G rear panel and Table 1-3 defines the rear panel components.

Figure 1-2. VH-8G Rear Panel

Table 1-2. Rear Panel Components

Name	Function
Power Connector	Provides AC power to the switch.
Redundant Power Connector	This connector is provided for a redundant power unit (RPU) which can supply power to the switch if its primary power supply fails. (Refer to the manual provided with the RPU for further details.)
Serial Console Port	Male DB-9 connector configured as a standard RS-232 connection for serial out-of-band management using the console menus.

Feature Summaries

The following summaries describe VH-8G features in areas such as standards compliance, functionality, performance, and options.

IEEE 802.1D Bridge

The VH-8G switch is fully compliant with IEEE 802.1D transparent bridging specifications. An address table is provided for learning, filtering, and forwarding. The switch can support up to a maximum of 12K addresses. Addresses are automatically learned by the switch, and can be individually assigned specific forwarding treatment by the network administrator if desired. Forwarding table configuration can be made out-of-band via the console interface or in-band via SNMP or Telnet. Static and dynamic addresses are both stored in this table. One static address is assigned per port by default. The Static Unicast Address Table Configuration screen in the console menus allows you to assign additional static addresses if required.

Spanning Tree Protocol

The VH-8G switch supports the IEEE 802.1D Spanning Tree Protocol. This protocol allows redundant connections to be created between different LAN segments for purposes of fault tolerance. Two or more physical paths between different segments can be created through the switch, with the Spanning Tree Protocol choosing a single path at any given time and disabling all others. If the chosen path fails for any reason, a disabled alternative is activated, thereby maintaining the connection. This prevents network traffic from circulating in an endless loop formed by multiple connections to the same LAN segment.

Spanning Tree parameters are configurable using the Spanning Tree Configuration Menu of the console menus, the on-board Web agent, or via SNMP (see Appendix A, “Spanning Tree Concepts,” in the VH-8G Management Guide for more information).

Frame Buffering and Frame Latency

The VH-8G switch is a store-and-forward switching device. Each frame is copied into switch memory before being forwarded to another port. This method ensures that all forwarded frames conform to a standard Ethernet frame size and have a correct cyclic redundancy check (CRC) for data integrity. This switching method prevents bad frames from traversing the network and using up valuable network bandwidth, as with cut-through switching technology.

To minimize the possibility of dropping frames on congested ports, the VH-8G switch provides 1 MB of frame buffering per port. This buffer space is used to queue packets for transmission on congested networks. This is an additional advantage over cut-through switching technology, which drops packets immediately when experiencing collisions.

Software Download

The VH-8G switch supports the industry-standard Trivial File Transfer Protocol (TFTP) for downloading software to the switch. All switch software is stored in a 2 MB sectored flash ROM. The download feature allows you to easily install software upgrades to the unit. Software can alternatively be downloaded via the serial console port using the XMODEM protocol.

A TFTP software download is invoked via the Management Setup Menu using the console menus. A TFTP download can also be invoked using the on-board Web agent or via SNMP.

Non-volatile Parameter Storage

Important operating parameters such as IP addresses, Spanning Tree configuration, and management security parameters, are stored in non volatile Flash memory. These values are retained when the switch experiences power interruptions or is powered down for normal maintenance.

Configuration and Management Interfaces

The VH-8G switch can be managed using any of the following methods:

- Serial console, out-of-band

  An RS-232 connection, using a DB-9 connector, is included on the switch's rear panel for system management. Serial console management can be performed out-of-band by directly connecting a terminal or computer running communications software to the RS-232 port on the switch. See the Management Guide for information on managing the VH-8G switch via the serial console.

- Telnet, in-band (over Ethernet)

  The switch supports management through a Telnet connection using the TCP/IP protocols. Telnet is performed using a terminal or computer running communications software. See the Management Guide for information on managing the system via Telnet. Global user name and password protection for changing the operating parameters of the switch is provided.

- Web-based network manager, in-band

  The system can be managed over HTTP protocol with a Web browser (Internet Explorer 4.0 or above, or Netscape Navigator 4.0 or above). Standard agent MIBs embedded in the switch provide basic SNMP management through an embedded graphic interface.

- SNMP-based network manager, in-band

  The system can also be managed using SNMP, the most common protocol used today for network management. Standard agent MIBs embedded in the switch provide basic SNMP management through industry-standard SNMP applications.

  Management security protection is provided based on SNMP community names. See Chapter 4, "SNMP Management," in the Management Guide for more information.

RMON

RMON (Remote Monitoring) is a facility used to manage networks remotely while providing multi-vendor interoperability between monitoring devices and management stations. RMON is defined by an SNMP MIB. This MIB is divided into nine different groups, each gathering specific statistical information or performing a specific function. RMON-capable devices gather network traffic data and then store them locally until downloaded to an SNMP management station.

The VH-8G supports four of the nine groups of RMON defined for Ethernet networks on a per segment basis. Specifically, these are:

- Statistics: a function that maintains counts of network traffic statistics such as number of packets, broadcasts, collisions, errors, and distribution of packet sizes.

- History: a function that collects historical statistics based on user-defined sampling intervals. The statistical information collected is the same as the Statistics group, except on a time stamped basis.

- Alarm: a function that allows managers to set alarm thresholds based on traffic statistics. Alarms trigger other actions through the Event group.
- Event: a function that operates with the Alarm group to define an action that will be taken when an alarm condition occurs. The event may write a log entry and/or send a trap message.

Note that RMON statistics and other information can only be viewed using a connection to the on-board web agent or via other compatible SNMP management applications.

Port Mirroring

The VH-8G switch includes the ability to mirror the traffic being switched on any port for purposes of network traffic analysis and connection integrity. When this feature is enabled, a protocol analyzer or RMON probe can be connected to the mirror port. You can only mirror one port to another port at one time. Port mirroring is configurable using the console interface menus, the on-board Web agent, or via SNMP.

BootP

The Bootstrap Protocol (BootP) provides for the capability of passing configuration information to hosts on a TCP/IP network. Using this process, network devices do not need to be configured before they can communicate using the TCP/IP protocol suite. The VH-8G switch uses BootP to automatically configure IP address information without requiring access to the console menus. BootP operation is configurable using the console interface menus, the on-board Web agent, or via SNMP.

LEDs

The switch port LEDs provide a quick and accurate display of the integrity of switch connections. Each SC port has a Link and Act LED. The Link LED indicates a valid 1000 Mbps connection or if the port has been disabled. The Act LED indicates network activity on the port segment.

Full-Duplex Mode

The full-duplex mode of operation on a port doubles the throughput of the switch connection. Full-duplex mode disables the collision detection portion of the Ethernet Carrier Sense Multiple Access with Collision Detection (CSMA/CD) protocol, allowing for two-way traffic. Full duplex is configurable using the console interface menus, the on-board Web agent, or via SNMP.

Flow Control

Flow control allows you to manage network traffic during congestion periods and to prevent the loss of packets when port buffer thresholds are exceeded. Flow control also serves to deny access to additional traffic that could add to a congestion condition. The VH-8G switch supports flow

control per the IEEE 802.3x standard. Note that flow control is disabled on all ports by default but can be enabled on a per-port basis by using the console interface menus, the on-board Web agent, or via SNMP. See Appendix B, “Flow Control,” for more information on this feature.

If flow control is desired for one port, it is recommended that it be enabled on all ports.

Virtual LANs (VLANs)

VLANs allow you to connect users to a specific LAN segment regardless of their physical location. The VH-8G switch supports tagged VLANs per the IEEE 802.1Q standard. With frame tagging, a short tag is appended to every frame that crosses the network backbone. The tag identifies which VLAN the frame belongs to. See Appendix B, “Virtual LANs,” in the VH-8G Management Guide for more information.

Class of Service

Class of Service support allows you to assign a higher priority to selected traffic passing through the switch. The VH-8G switch supports Class of Service attributes per the IEEE 802.1p standard using a priority queuing mechanism. This feature ensures that traffic during congestion periods will not interfere with traffic assigned a higher priority. Traffic assigned a lower priority is subject to discard when memory is in short supply. See Appendix C, “Class of Service,” in the VH-8G Management Guide for more information.

Port Trunking

Port trunking allows you to combine ports into an aggregate connection between VH-8G switches. Besides balancing the load across each port in the trunk, the additional ports provide redundancy by taking over the load if a port in the trunk should fail. The VH-8G allows up to four ports to be joined together as a trunk. Up to four port trunks on a single switch can be configured. Each trunk can combine two, three, or four ports, creating an aggregate bandwidth of up to 8Gbps.

Factory Defaults

Table 1-3 lists the default settings for switch configuration parameters. Each parameter can be changed via the console menus or Telnet.

Table 1-3. Factory Default Settings

Parameter	Default Value
Multicast Filtering	
GMRP	Disabled
IGMP Multicast Filtering	Disabled
Port Configuration	
Flow Control	Disabled
Speed and Duplex	Auto
Admin	Enabled
Broadcast Storm Control	Enabled - 500 pps
Port Priority	
Default Ingress User Priority	0
Spanning Tree Algorithm	
Active Aging Time	300
Bridge Priority	32768
Forward Delay	15
Hello Time	2
Max Age	20
Path Cost	4 - 1000Mbps ports
Port Priority	128
Spanning Tree Protocol	Enabled
System Configuration	
Management VLAN	All
BootP Enable	Disabled
Password	<none>
Screen Timeout	10 min
Send Authentication Fail Traps	Enabled
SNMP Community Name	public, private
Terminal Baud Rate	Auto
User Names	admin, guest

Parameter	Default Value
Virtual LANs	
Acceptable VLAN Frame Type	All
Configurable PVID Tagging	Yes
GVRP	Disabled
Untagged VLAN Group Assignment	1
VLAN Ingress Filtering	False
VLAN Learning	SVL

Application Examples

The exploding popularity of the Internet and of corporate intranets, as well as new, high-bandwidth desktop applications, are driving the demand for Gigabit Ethernet. The increase in multimedia traffic and the need to support legacy protocols alongside new, data intensive applications is driving the need for network segmentation and traffic prioritization.

The VH-8G switch is ideal for meeting the needs of today's high performance networks. The switch is designed to consolidate your network core providing high-bandwidth connections between workgroup switches and server farms. In addition, extensive features, including redundant links, traffic Class of Service and VLAN capability, provide the management needed for the workgroup and local backbone.

The following sections illustrate the VH-8G switch employed in application examples:

- Client/Server Network
- Backbone Consolidation

Client/Server Network Application

To improve workstation performance in a client/server environment, the VH-8G switch can be configured to provide 2 Gbps full-duplex Gigabit Ethernet connections to servers by connecting each to a dedicated switch port (Figure 1-3). Users can be accommodated through connections to other switches with 1000 Mbps uplinks, or through direct connections.

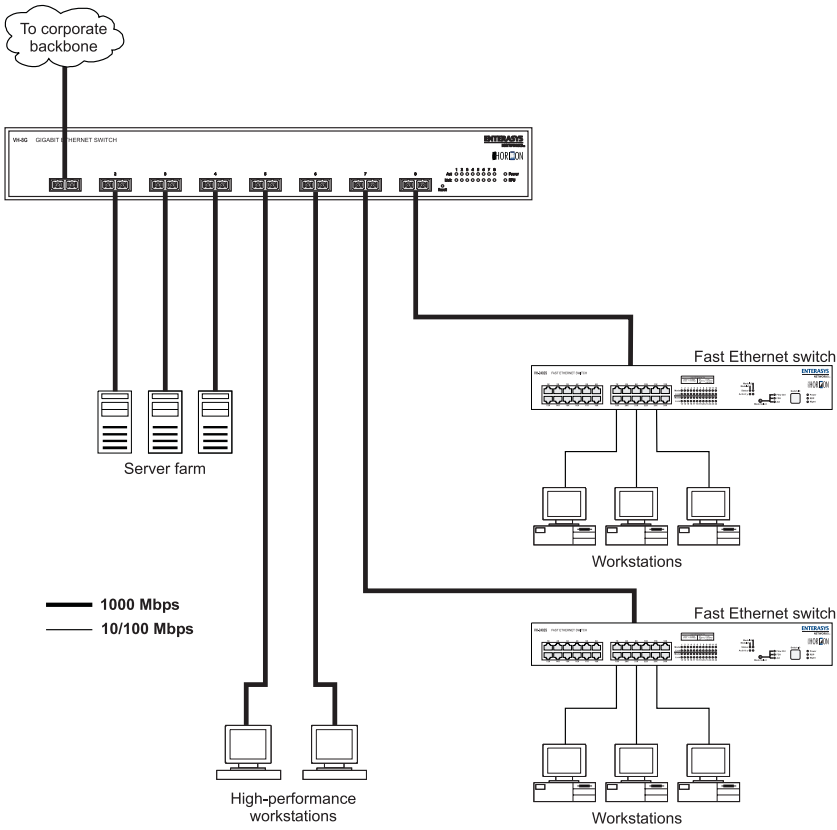

Figure 1-3. Client/Server Network Application

Backbone Consolidation Application

The VH-8G switch can be used in a backbone consolidation application, connecting network switches together and providing file-server access (Figure 1-4). Workgroup switches are provided with a single connection to the VH-8G while servers are put on dedicated ports. The gigabit fiber links allow the switch to connect to a remote location, such as another building floor or a separate building.

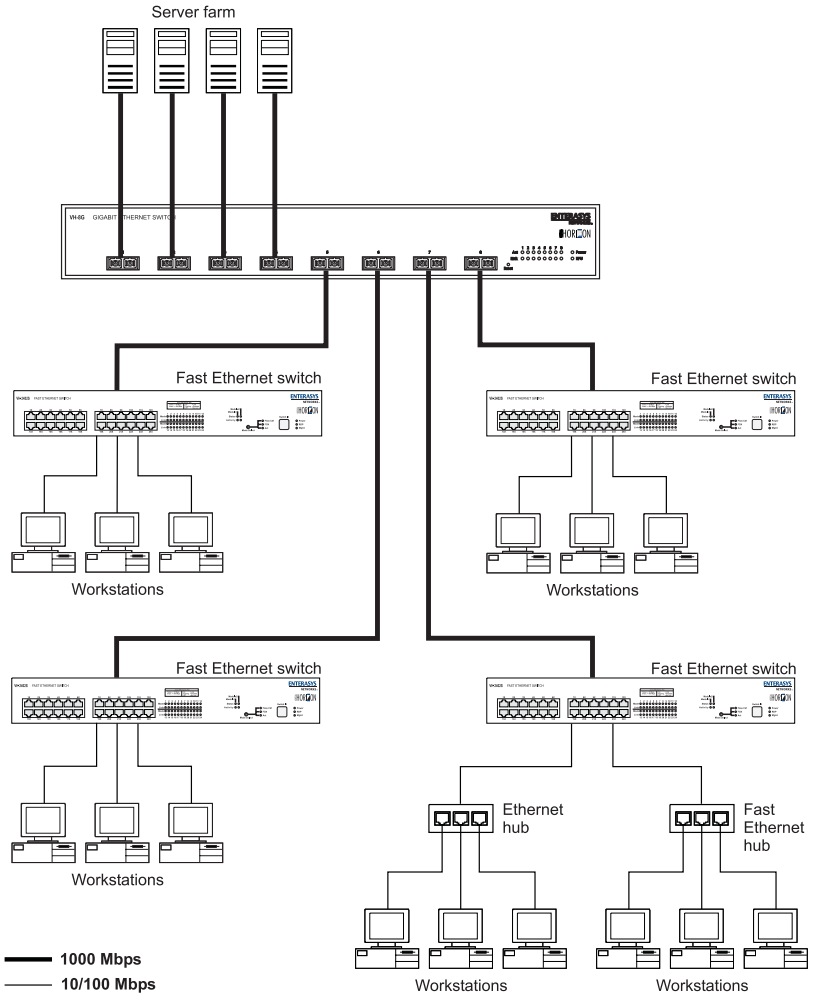

Figure 1-4. Consolidated Backbone Application

2. INSTALLATION

Inspecting Your Shipment

When you receive the shipment of your switch, check the package contents and make sure you have the following items:

- VH-8G switch
- Mounting ears and mounting screws
- Four rubber feet
- ESD wrist strap
- Power cord
- RS-232 null-modem cable
- Product documentation

Site Requirements

Before you install the switch, make sure the site meets the following requirements:

- Mounting

  Provide a flat table, shelf surface, or an optional 19 in. (48.3 cm) equipment rack.

  Use an EIA standard equipment rack that is grounded and physically secure.

- Power source

  Provide a power source within six feet (1.8 m) of the installation location. This source must provide 100 VAC to 240 VAC at 50 Hz to 60 Hz, for 80 VA minimum power. Power specifications for the switch are shown in Appendix A, “Technical Specifications.”

Primary voltage selection within the above ranges is automatic and requires no user action.

- Environmental

  Install the VH-8G switch in a dry area, with adequate air circulation. Avoid placing the switch in direct sunlight or near other heat sources, such as hot-air vents. For temperature and humidity specifications, see Appendix A, “Technical Specifications.”

- Ventilation

  Do not restrict airflow by covering or obstructing air inlets on the side of the switch.

Mounting the Switch on a Table or Shelf

You can mount a standalone switch on a table or shelf. Locate the switch in a position that allows access to the front panel SC ports, visibility of the port LEDs, and access to the rear-panel console port and power cord. Make sure that the mounting surface can safely support the switch and that there is adequate space around the switch for ventilation and cooling.

1. The switch ships with four (4) rubber feet. Stick the self-adhesive rubber foot pads on each of the four concave spaces located on the bottom of the switch. The rubber foot pads cushion the switch against shock/vibrations and provide space between each switch for ventilation.
2. If you want to stack switches, repeat step 1 for each switch to be stacked. Place the first switch on a firm flat surface where you want to install the stack. Stack the other switches on top of this unit.

Mounting the Switch in a Rack

The switch ships with two (2) multi-position mounting ears and four (4) mounting screws.

The mounting screws are used to attach the mounting ears to the switch. Once the ears are attached to the switch, you will need to provide appropriate screws to mount the switch in a rack.

Figure 2-1 shows the orientation of the mounting ears for attaching the ears to the switch for a rack mount application. Mount the switch with the front panel facing forward. Do the following:

1. Mount one of the ears to the switch using two (2) of the supplied screws. Repeat this step for the other side of the switch.
2. Slide the switch into the rack and align the holes in the rack mounting ears with the holes in the rack rails.
3. Insert and tighten appropriate rack-mounting screws (not provided).

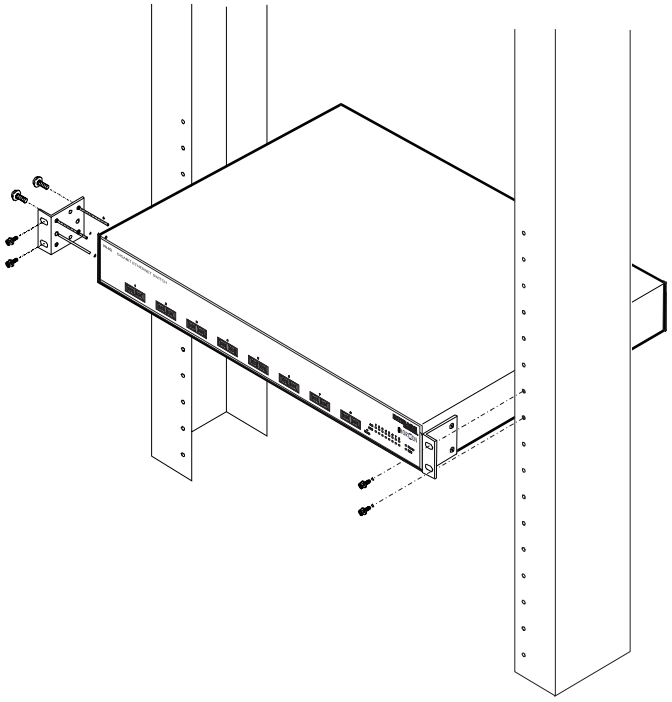

Figure 2-1. Mounting the Switch in a Rack

Connecting a Terminal to the Console Port

The console port is a serial RS-232 interface port that enables a connection to a terminal for performing switch monitoring and configuration functions. The terminal may be a PC or workstation running terminal emulation software, or a terminal configured as a Data Terminal Equipment (DTE) connection.

If you connect a terminal to the console port prior to powering on the switch, you can observe the progress and results of the power-on self test as the switch goes through its initialization process. See “Powering the Switch” on page 18.

The console port is configured as a standard RS-232 connection using a male DB-9 connector (see Table A-1 for pinouts). A null-modem wired RS-232 cable is supplied with the switch for connecting to this interface. This cable is shielded to comply with emissions regulations and requirements.

Console Port (Out-of-Band) Connections

To connect the VH-8G console port to a terminal, do the following:

1. Connect a VT100 compatible terminal or a PC running a terminal emulation program to the console port (Figure 2-2). Use the null-modem cable provided with the switch, or use a null-modem connection that is compatible with the console port pin assignments shown in Appendix A.

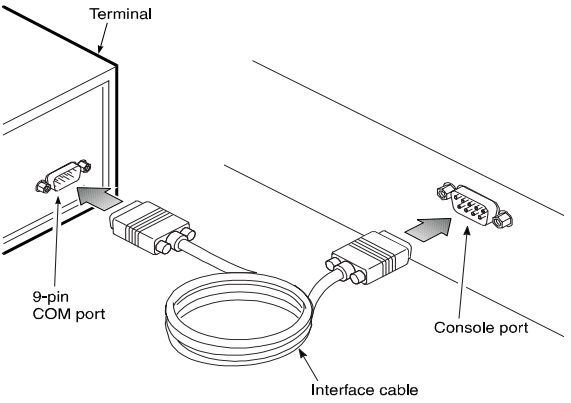

Figure 2-2. Connecting a Terminal to the Console Port

2. Connect one end of the interface cable directly to the switch’s console port and tighten the retaining screws.
3. Connect the other end of the interface cable to a terminal (in some instances, an adapter may be required to make this connection).
4. From your terminal, start the terminal emulation program.

5. Configure the terminal to the following communication settings: VT100 emulation, 19200 baud, no parity, 8 data bits, 1 stop bit, no flow control, ASCII character set.

In-Band Connections

Prior to accessing the switch via a network connection, you must configure it with a valid IP address, subnet mask, and default gateway using an out-of-band connection or the BootP protocol.

The switch must first be configured to issue BootP requests, since the default is BootP disabled. Refer to the Management Guide for more information.

Telnet Connection - Prior to accessing the switch via an in-band Telnet connection, you must configure it with a valid IP address, subnet mask, and default gateway using an out-of-band connection or the BootP protocol. After configuring the switch's IP parameters, you can access the on-board configuration program from anywhere within the attached network.

In-Band Network Connection - The on-board configuration program can be accessed using Telnet from any computer attached to the network. The switch can also be managed by any computer using a web browser (Internet Explorer 4.0 or above, or Netscape Navigator 4.0 or above), or from a network computer using third-party network management software.

Powering the Switch

To supply power to the switch, connect the power cord to the switch and to a grounded three-prong wall outlet (Figure 2-3). See Appendix A “Technical Specifications” on page 21 for more information regarding specific international power cord requirements.

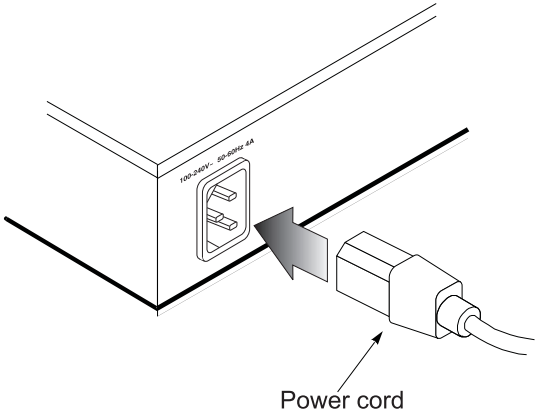

Figure 2-3. Connecting the Power Cord

The Power LED lights green (see Figure 1-1). If it does not, check to make sure that the power cable is plugged in correctly and that the power source is good.

When power is applied, the switch conducts a series of hardware and software tests to verify operation. If a terminal or computer is connected to the console port, the results of the tests are displayed on the screen. If you want to display the results of the tests after the switch has been turned on, turn the power to the switch off then back on.

The switch performs two basic types of tests at power-up. During this time, all the LEDs light in sequence. These tests are:

- Serial port

  The serial console port test is the first test. If the switch fails, no further tests are performed and the console displays no information.

- Memory

  Memory tests on the CPU RAM are performed after the serial port test.

After these tests are performed, the system initialization screen provides the option of starting the operational software of the switch or performing an XMODEM download to upgrade system firmware. When the operational software is started, the system is functional and the user interface is ready to receive commands at the console.

Network Cable Requirements

Fiber

Table 2-1 specifies the fiber types, bandwidth requirements, and length constraints for the Gigabit Ethernet fiber interface on the switch's SC ports.

Table 2-1. 1000Base-SX Fiber Specifications

Fiber Diameter (microns)	Modal Bandwidth @ 850 nm	Range
62.5 µm MMF	160 MHz/km	2-220 Meters
62.5 µm MMF	200 MHz/km	2-275 Meters
50 µm MMF	400 MHz/km	2-500 Meters
50 µm MMF	500 MHz/km	2-550 Meters

1000Base-SX Fiber Ports

The 1000Base-SX fiber ports use SC connectors. Figure 2-4 shows an SC fiber connector being inserted into a fiber port on the VH-8G.

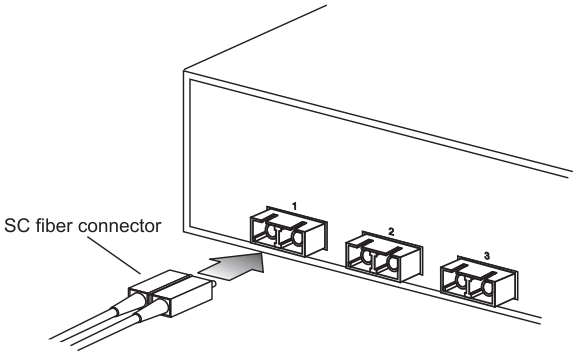

Figure 2-4. Inserting an SC Fiber Connector into a Fiber Port

The 1000Base-SX fiber SC ports support multi-mode 62.5/125µm fiber. The fiber connectors are configured as a receive (RX) / transmit (TX) pair.

This switch uses lasers to transmit signals over fiber optic cable. The lasers are compliant with the requirements of a Class 1 Laser Product and are inherently eye safe in normal operation. However, you should never look directly at a transmit port when it is powered on.

Before connecting cables, you may want to first configure the Spanning Tree Protocol and trunk links to avoid network loops. Refer to the Management Guide for more information.

1. Remove and keep the SC port's rubber cover. When not connected to a fiber cable, the rubber cover should be replaced to protect the optics.
2. Check that the fiber terminators are clean. You can clean the cable plugs by wiping them gently with a clean tissue or cotton ball moistened with a little ethanol. Dirty fiber terminators on fiber optic cables will impair the quality of the light transmitted through the cable and lead to degraded performance on the port.
3. Connect one end of the cable to the SC port on the switch and the other end to the SC port on the other device. Since SC connectors are keyed, the cable can be attached in only one orientation.
4. As a connection is made, check the green Link LED on the switch corresponding to the port to be sure that the connection is valid.

APPENDIX A. TECHNICAL SPECIFICATIONS

General

Standards Compliance

IEEE 802.1D Transparent Bridging Specifications (ISO/IEC 10038)

IEEE 802.1p Traffic Class Expediting and Dynamic Multicast Filtering

IEEE 802.1Q Virtual Bridged Local Area Networks

IEEE 802.2 Local Area Networks, Logical Link Control (LLC)

IEEE 802.3 CSMA/CD 9 (ISO/IEC 8802-3)

IEEE 802.3z 1000Base-SX

IEEE 802.3x Flow Control

EIA RS-232C (DTE-to-DCE)

EIA RS-310C (19” rackmount)

Regulatory Compliance

Safety: UL 1950, CSA C22.2 No 950, 73/23/EEC, EN 60950, IEC 950

Electromagnetic Compatibility (EMC): FCC Part 15, CSA C108.8, 89/336/EEC, EN 55022, EN 61000-3-2, EN 61000-3-3, EN 50082-1, AS/NZS 3548, VCCI V-3

Data Rate

1000 Mbps 8B/10B encoded.

Environmental Specifications

Operating temperature:	32° to 122° F (0° to 50° C)
Operating humidity:	5 to 95% relative, non-condensing
Storage temperature:	-40° to 158° F (-40° to 70° C)
Storage humidity:	5 to 95% relative, non-condensing

Electrical Specifications

Input voltage:	100-240 VAC
Input frequency:	50-60 Hz
Maximum power consumption:	80 VA

Physical

Height:	2.5 in. (6.4 cm)
Length:	11.2 in. (28.5 cm)
Width:	17.3 in. (44 cm mountable in a standard 19 in. rack)
Weight:	10.14 lb. (4.6 kg)

Port Specifications

Console Port

Table A-1 shows the console port pin assignments.

Table A-1. RS-232 Console Port Pin Assignments

Pin	Signal Name
1	DCD
2	RXD
3	TXD
4	DTR
5	Ground
6	DSR
7	RTS
8	CTS
9	RI

Power Cord Set Requirements

The wide-range input feature of the VH-8G Gigabit Ethernet switch permits it to operate from any line voltage between 100 and 240 VAC.

The power cord set (appliance coupler, flexible cord, and wall plug) you received with the switch meets the requirements for use in the country where you purchased the switch.

Power cord sets for use in other countries must meet the requirements of the country where you use the switch. For more information on power cord set requirements, contact your Enterasys Networks Support Representative.

General Requirements

The requirements listed below are applicable to all countries:

- The length of the power cord set must be at least 5.00 feet (1.5 m) and a maximum of 6.56 feet (2.0 m).
- All power cord sets must be approved by an acceptable accredited agency responsible for evaluation in the country where the power cord set will be used.

- The power cord set must have a minimum current capacity of 10A and a nominal voltage rating of 125 or 250 VAC, as required by each country's power system.
- The appliance coupler must meet the mechanical configuration of an EN 60 320/IEC 320 Standard Sheet C13 connector for mating with appliance inlet on the hub.

Country-Specific Requirements

Table A-2 lists the power cord set requirements by country and identifies the accredited agency within that country.

Table A-2. Power Cord Set Requirements by Country

Country	Accredited Agency	See Notes *
Australia	EANSW	1
Austria	OVE	1
Belgium	CEBC	1
Canada	CSA	2
Denmark	DEMKO	1
Finland	FIMKO	1
France	UTE	1
Germany	VDE	1
Italy	IMQ	1
Japan	JIS	3
Netherlands	KEMA	1
Norway	NEMKO	1
Sweden	SEMKO	1
Switzerland	SEV	1
United Kingdom	BSI	1
United States	UL	2

*** The note column includes a number. Associate this number with the corresponding notes listed after the table to obtain specific power standards and requirements.**

Note 1

Flexible cord must be <HAR> Type HO5VV-F or HO3VV-F, 3-conductor, 1.0 mm^2, or 0.75 mm^2 conductor size. Power cord set fittings (appliance coupler and wall plug) must bear the certification mark of the agency responsible for evaluation in the country where it will be used.

Note 2

Flexible cord must be Type SV, SJ, SPT or equivalent, No. 18 AWG, 3-conductor. Wall plug must be a two-pole grounding type with a NEMA 5-15P (15A, 125V) or NEMA 6-15P (15A 250V) configuration.

Note 3

Appliance coupler, flexible cord, and wall plug must bear a “T” mark and registration number in accordance with the Japanese Dentori Law. Flexible cord must be Type VCT or VCTF, 3-conductor, 0.75mm^2 conductor size. Wall plug must be a two-pole grounding type with a Japanese Industrial Standard C8303 (15A, 125V) configuration.

APPENDIX B. FLOW CONTROL

Flow control is a mechanism which allows you to protect the switch from overload conditions and to keep additional traffic off the network when excessive congestion will result. Figure B-1 illustrates flow control for both half- and full-duplex applications.

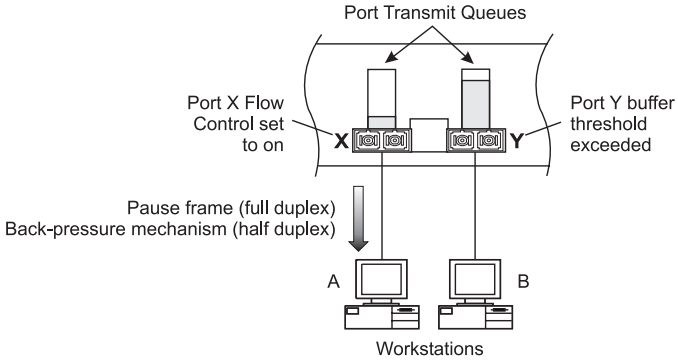

Figure B-1. Flow Control for Full- and Half-Duplex Applications

Each port of the switch has a transmit queue which buffers frames to be sent out on that port. In this example, large amounts of data are being sent from Workstation A (connected to port X) and other ports on the switch to Workstation B (connected to port Y).The queue on port Y starts filling up with data until it reaches a determined threshold. The packet which causes the threshold to be exceeded triggers the flow-control function on the port from which the packet entered the switch, in this case port X.

Since port X is configured with flow control set to Enabled, the switch responds by initiating a pause frame (full-duplex applications) or back-pressure mechanism (half-duplex applications). The pause frame causes Workstation A to stop sending packets. After a certain amount of time has elapsed, determined by a value in the pause frame, Workstation A will resume sending data. Similarly, the back-pressure mechanism forces Workstation A to stop sending packets by inducing collisions on port X.

The pause-frame flow-control mechanism supported by the VH-8G switch conforms with the IEEE 802.3x specification for full-duplex flow control.

For the full-duplex pause-frame mechanism to work, the device connected to the switch port must also support IEEE 802.3x flow control. Flow control is configurable per port in the Port Configuration Menu of the console menus, using the on-board Web agent, or via SNMP.

APPENDIX C. ACRONYMS & ABBREVIATIONS

Term	Definition
10Base-T	10 Mbps twisted-pair Ethernet
100Base-TX	100 Mbps twisted-pair Fast Ethernet
100Base-FX	100 Mbps fiber option Fast Ethernet
1000Base-SX	1000 Mbps fiber option short-wavelength Gigabit Ethernet
1000Base-LX	1000 Mbps fiber option long-wavelength Gigabit Ethernet
ANSI	American National Standards Institute
BootP	Bootstrap Protocol
CAT5	Category 5
CRC	Cyclic Redundancy Check
CSMA/CD	Carrier Sense Multiple Access/Collision Detection
DCE	Data Communications Equipment (modem)
DSR	Data Send Ready
DTE	Data Terminal Equipment
DTR	Data Terminal Ready
ESD	Electrostatic Discharge
FCS	Frame Check Sequence
HTTP	Hypertext Transfer Protocol
ICMP	Internet Control Message Protocol
IEEE	Institute of Electrical and Electronics Engineers
IP	Internet Protocol
LAN	Local Area Network
MAC	Media Access Control
MDI	Media Dependent Interface
LED	Light Emitting Diode
MDI	Media Device Interface
MIB	Management Information Base
RFC	Request for Comment
RMON	Remote Monitoring
RXD	Receive Data

Term	Definition
SNMP	Simple Network Management Protocol
TCP/IP	Transmission Control Protocol/Internet Protocol
TFTP	Trivial File Transfer Protocol
TXD	Transmit Data
UTP	Unshielded Twisted Pair
VLAN	Virtual LAN

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